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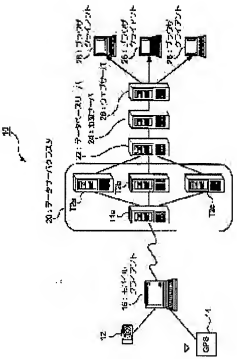
(54) LIVE MOBILE CAMERA SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To transmit realtime digital multimedia data with smaller transmission delay and lower error rate to equalize communication load among multiple servers of different networks.

SOLUTION: The invention provides a live mobile camera system equipped with a communication protocol of variable segment size and a server cluster of 2 layers. The variable segment size communication protocol divides digital data into segments at the application layer, and makes these segments into packets at the internet protocol layer. This communication protocol is used in one embodiment at a radio link and uses an internet protocol called as UDP (user datagram protocol). The server cluster of 2 layers contains multiple servers belonging to a first layer, each of those first layer servers manages one or more of second layer servers, and these second layer servers may be allocated under another first layer server.



DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]Especially this invention relates to communication between a client and a server, concerning an electronic network generally.
[0002]
[Description of the Prior Art]Although much communication applications became available by development of the network art between client servers, most present networking applications possess only the limited function. Typical application comprises some clients which communicate with one or more independent servers. Since a server memorizes accessible data by the request from a client, generally it is called the application server or the database server.
[0003]There is a live mobile camera system as larger networking application of usefulness. Usually, the mobile client connected to the network is contained in the live mobile camera system. Since it is usually connected to the network via the radio link, even if this mobile client does not perform wired connection with a network, it can be freely moved to a place from a place. In addition to the camera for acquiring the visual images of the field of the self-opportunity circumference, this mobile client is further provided with the GPS receiver for searching the geographic point of a self-opportunity. That is, the mobile client can return visual images and geographic information to an application server. On the other hand, the browser client can control the fixed function of a mobile client by transmitting a command to a mobile client via a server system. The browser client can also supervise the group of a specific mobile client or two or more mobile clients in the area where a certain field was specified. A live mobile camera system can be applied to various uses, such as a live report of the amount of motor traffics, surveillance of a store or a bank, pursuit of a taxi, record of police activity.
[0004]Generally, the network used for a live mobile camera system is the Internet network

which used Internet Protocol. As an advantage which uses the Internet for communication between a server system and a mobile client, it is the point that compatibility with existing network application is maintainable. Since the device of the standardized networking can be used, a live mobile camera system can be performed more easily, cheaply, and promptly by using the Internet.

[0005]However, the point of not being suitable for the present Internet Protocol transmitting the digital multimedia data of real time with a low error rate as a problem of hitting using the Internet for a live mobile camera system is mentioned. There are some which are called TCP (Transmission Control Protocol) in well-known Internet Protocol, and this TCP can transmit data certainly by a low error rate. However, when transmitting the digital multimedia data of real time and this TCP is used for the live mobile camera system depending on a radio link, a big transit delay occurs frequently. The cause of this delay depends on TCP not being what was designed so that the transmission quality might use with a wireless system faulty in many cases as compared with the transmitting link of a cable. TCP assumes rather that network congestion generates all transmission errors owing to.

The low quality of a transmitting link does not assume the data loss generated owing to. As a result, in order that TCP may repeat and broadcast again the data packet lost or damaged in the process of transmission, it will cause a remarkable transit delay.

[0006]Some which are called UDP (User Datagram Protocol) are known by another Internet Protocol. In the procedure of the default configuration, since all the packets lost or damaged are disregarded, UDP can transmit data quickly compared with TCP. However, since UDP is an unreliable protocol, it is not usually suitable for application like the live mobile camera system with which a high error rate is not permitted. Thus, the method of transmitting the digital multimedia data of real time by fewer transit delays and a low error rate is called for.

[0007]A live mobile camera system will apply a heavy load also to the data server side which receives the transmitted multimedia data of real time. In the network between the client servers from the former, in order to communicate with many clients, a singular server is used. When the time of rush hours of a main server and the whole main server become off-line, he is trying for a backup server to be able to process communicative a part or all by preparing a backup server for the case where a lot of communication load is predicted.

[0008]However, the server network of a conventional type cannot carry out balancing of the communication load among some servers in a different network. Although balancing of the load between two or more servers is useful in many networking applications, since the especially big communication load in a live mobile camera system is predicted and high reliability is needed, especially in such application, it is important. That is, the server cluster which carries out balancing of the communication load between the servers of the plurality of a different network is needed.

[0009]
[Problem(s) to be Solved by the Invention]This invention is made in view of the problem of conventional technology of having explained above, and is a thing.
The purpose is to provide the server cluster which carries out balancing of the communication load between the servers of the plurality of the method of transmitting the digital multimedia data of ** by fewer transit delays and a low error rate, and a different network.

[0010]
[Means for Solving the Problem]In order to solve an aforementioned problem, a live mobile camera system concerning this invention provides a server cluster for carrying out balancing of the communication load between one or more servers in an especially suitable communications protocol for a radio link, and a different network.
[0011]A communications protocol concerning this invention classifies digital multimedia data of real time into a segment in the application layer, and packet-izes it in an Internet Protocol layer. Size of this segment is variable according to a packet error generated during transmission of a segment. It is preferred to use UDP (UserDatagram Protocol) as an Internet Protocol layer.
[0012]In one mode of operation of this invention, the above-mentioned communications protocol, Digital data is classified into a segment in the 1st application layer, Said segment is packet-ized in the 1st Internet Protocol layer, said packet is reassembled in the 2nd Internet Protocol layer, and said segment is characterized by reassembly ****** in the 2nd application layer. Preferably, it has a process in which said packet is transmitted and received via a radio link between processes of reassembly of packet-izing and said packet.
[0013]In another desirable mode, it inspects whether said packet has an error and said segment size is changed according to a result of said packet inspection. In this case, when a packet error is not detected by said digital data by said packet inspection, said segment size is expanded, and when a packet error is detected by said digital data by said packet inspection, said segment size is made to reduce. This segment size may be made to be changed between a minimum and a maximum. When a packet error is not detected by digital data by said packet inspection and said segment size is said maximum, When said segment size is not changed, and a packet error is not detected by digital data by said packet inspection and said segment size is not said maximum, When said segment size is expanded, and a packet error is detected by digital data by said packet inspection and said segment size is a minimum, It is not changed but a packet error is detected by digital data by said packet inspection, and said segment size reduces said segment size, when said segment size is not a minimum.
[0014]In another desirable mode, it is characterized by inspecting whether a communications protocol concerning this invention has an error in said packet, and not broadcasting again a

segment which does not have a packet error, but broadcasting again only a segment which has a packet error. Preferably, according to a result of said packet inspection, at least 1 of said segment is broadcast [application layer / said / 1st] again from said 1st Internet Protocol layer. As for said digital data which is a digitization picture of vision environment of the mobile client circumference, generating in a live mobile camera system is preferred. It may be made to have a process in which said packet is transmitted and received via a radio link between processes of said packet-izing and reassembly of said packet.

[0015]A server cluster concerning this invention has the 1st layer server and the 2nd layer server. Each of the 1st layer server manages the one or more 2nd layer servers. Balancing of the communication load to the 2nd layer server is carried out by transmitting a communication interface to the 2nd layer server with less load than other 2nd layer servers. The 1st layer server may cope with down time of the 1st layer server, and a problem of other load imbalance by re-assigning a subordinate of other 1st layer servers the 2nd layer server.

[0016]In one mode of operation of this invention, the above-mentioned server cluster, Are a server cluster which has the 1st layer and the 2nd layer, and each of said 1st layer and said 2nd layer has a server of at least 1, It is characterized by said 2nd layer answering said demand by said 1st layer's managing said 2nd layer, and said 1st layer's receiving a demand which asks for a communication interface, and transmitting said demand to said 2nd layer. Preferably, said 2nd layer has a server of at least 2. A communication interface will be set up, if the 2nd layer each server answers said demand and the first 2nd layer server answers.

[0017]Said 1st layer comprises a server of at least 2, and it may be made for each of said 1st layer server to manage the 2nd layer server of at least 2 in another desirable mode. In this case, a server of 1 of said two or more 1st layer servers may re-assign a subordinate of other servers of 1 of said two or more 1st layer servers a server of 1 of said two or more 2nd layer servers which self manages. In this re-assignment, the 1st layer server which performs said re-assignment, a message which asks for acceptance of said server of 1 of said two or more 2nd layer servers -- said two or more 1st layer servers -- said -- others -- transmitting to a server of 1 -- said two or more 1st layer servers -- said -- others -- a server of 1, if said request message is received, It can be set up manage said server of 1 of said two or more 2nd layer servers.

[0018]Preferably, a server of at least 2 of said 1st layer server communicates mutually using Internet Protocol, and said server of at least 2 is a different server network.

[0019]A claimant transmits a demand which asks for said communication interface, and it may be made for said claimant to memorize one identification information of said two or more 1st layer servers as a default server of a transmission destination of said demand in a server cluster in another desirable mode. In this case, said claimant can update identification information of two or more of said memorized 1st layer servers, and said claimant can choose either of said two or more 1st layer servers as a transmission destination of said demand.

Preferably, said 1st layer communicates with said 2nd layer using Internet Protocol, and said 1st layer and said 2nd layer are different server networks. In this case, said server of at least 2 of the 2nd layer is good also as a different server network.

[0020]A radio link may be connected with said demanded communication interface in another mode. A live mobile camera system has a mobile client with a camera, and photos visual images of said mobile client circumference with said camera, and said picture may be made to be transmitted via said communication interface.

[0021]A live mobile camera system concerning this invention, Probably, it will be clear for a person skilled in the art that various modes which contain a communications protocol and a server cluster which mentioned many above-mentioned modes in various combination can be taken by examining a practice of this invention indicated by this application specification.

[0022]

[Embodiment of the Invention]The live mobile camera system 10 is explained referring to drawing 1 especially among attached drawings. The live mobile camera system 10 enables a user to supervise the vision environment of the mobile client 16 circumference, and the geographic point of the mobile client 16. Generally, a user communicates with the mobile client 16 via the server system and the browser client 28 containing the data server cluster 20, the database server 22, the map server 24, and the web server 26.

[0023]Even if the live mobile camera system 10 is a gestalt including all the components currently explained in this application specification, it may be a gestalt which contains a chisel in part. A gestalt including other components which are not explained in this application specification can also be taken. Generally, the live mobile camera system 10 contains the mobile client 16. Although standard laptop type PC may be sufficient as this mobile client 16, the specialized type computer which was mounted in the car or was accommodated in the monitor station is preferred. The mobile client 16 is connected to the camera 12 for receiving the digital multimedia data of the real time of the vision environment of the self-opportunity circumference. The mobile client 16 is connected to the GPS (Global Positioning System) receiver for acquiring the data of the geographic point of a self-opportunity.

[0024]The browser client 28 supervises the mobile client 16 via the server system containing the data server cluster 20, the database server 22, the map server 24, and the web server 26 which use HTTP (Hypertext Transfer Protocol). The mobile client 16 may be connected to this server system via various communication interfaces, such as a ground telephone wire. However, since the direction of flexibility of the mobile client 16 which used the radio link improves, it is more desirable. Although explained below, in order to raise the reliability of the digital multimedia data communications of the real time by a radio link, and an efficient throughput, the variable segment size communications protocol 70 is used.

[0025]The data server cluster 20 receives data from the mobile client 16, and also transmits

data to the mobile client 16 from the browser client 28. Although explained later, the data server cluster 20 is constituted and formed in two-layer in order to raise the capacity rating of reliability and the data server cluster 20. The data server cluster 20 is connected to the map server 24 which stores two or more maps as a classic example of the geographic point in which the mobile client 16 may be located.

[0026]It is connected to the web server 26 which receives a command from the browser client 28, and the database server 22 and the map server 24 transmit the demanded data to the browser client 28. Communication with the server system containing the data server cluster 20, the database server 22, the map server 24, and the web server 26 is possible for the browser client 28, Reception of the input from a user is performed, and as long as the display of the demanded data is possible, the computer of which kind may be used.

[0027]When a user wants to supervise a certain place visually from the position which separated, in the various examples of application, the live mobile camera system 10 is useful, so that clearly from the above. It enables a user to supervise the geographical position of the visual images which the mobile client 16 collected with the live mobile camera system 10. If a radio link is used between the mobile client 16 and a server system (the data server cluster 20, the database server 22, the map server 24, and the web server 26 are included), The further flexibility becomes possible, the mobile client 16 is can move between two or more places, and it becomes easy for a user to supervise two or more of these places.

[0028]Next, with reference to drawing 2, the variable segment size communications protocol 70 is explained. Generally, the communications protocol 70 segments this digital data to a small part, before the digital multimedia data of real time is packet-ized in an Internet Protocol layer. The size of this segment can be changed at a next step according to the quality of a radio link. The variable segment size communications protocol 70 is used with a standard Internet Protocol layer called UDP (User Datagram Protocol). Generally, compared with TCP (Transmission Control Protocol), access speed of UDP is quick. In UDP, it is because it does not have composition which broadcasts data again automatically when a data packet is lost or damaged from a digital data frame. Therefore, the send efficiency of the application layer in a radio link improves by broadcasting again only the segment containing a loss or a damage packet.

[0029]The variable segment size communications protocol 70 is first started from the generation procedure of the digital multimedia data frame of real time (S40). Although the digital multimedia data of various kinds of real time can be used for the variable segment size communications protocol 70, Especially the digital multimedia data of the real time which the mobile client 16 generated in the live mobile camera system 10 fits the variable segment size communications protocol 70. For example, the size of a typical digital multimedia data frame is about 10 K bytes. This digital multimedia data frame is segmented by the small part, i.e., a

segment, by the application layer (S42). That is, when default segment size is 500 bytes, the digital data frame which is 10 K bytes will be generated 20 segments. Default segment size is good preferably to set up, when designing application system.

[0030]Next, each segment is divided into some discrete data packets which can transmit a network top in an UDP layer (S44). When transmitting the digital multimedia data packet of real time via a radio link, it is preferred to use an UDP layer. It is because access speed of UDP is quite high-speed compared with TCP when the quality of a transmitting link is inferior. When a radio link is used for this invention next, a data packet is transmitted from a mobile client (S46).

[0031]Next, a radio data packet is received by the 2nd layer server T2a, T2b, either of the T2c, or the suitable receiver (S48). And a data packet is reassembled by the original segment (S50). That is, in the above-mentioned example, a data packet is separately reassembled by the 20 original segments. Next, it is judged whether there are some which inspected each segment, and have been damaged or lost in the data packet in a segment (S52). When judged with a segment having damage or a lost data packet, a message is returned to a mobile client and it is required that the specific data segment containing damage and a lost data packet should be broadcast again (S47). A segment is reassembled by the original data frame when all the segments are transmitted without the damage to a data packet, or a loss (S54).

[0032]Next, segment size is inspected and the segment size for digital multimedia data frame transmission of the following real time is optimized. When the quality of a transmitting link is inferior, in order to make small size of a segment in case the possibility of the packet error was minimized and retransmission of message is needed, the smaller one of segment size is good. Since it is necessary to add separately the header used on the other hand when a network carries out routing of the segment to the destination to each segment, when a segment is made small, transmission efficiency will fall. Therefore, when the quality of a transmitting link is good, larger segment size is good.

[0033]Therefore, when there is nothing that was damaged or lost during transmission in the data packet of the digital multimedia data frame of the first real time, that segment size is permissible is judged or it is judged that it is too small. And the full limits which show the maximum of the segment size considered to be suitable for the transmission system are compared with the value of the present segment size (S56). If the present segment size has already reached the maximum, segment size will not be changed but will be kept unchanged with allowable maximum (S58). On the other hand, when the present segment size has not reached a maximum, segment size is expanded 10%.

[0034]When similarly what was damaged or lost exists during transmission by the data packet of the digital multimedia data frame of the first real time, it is judged that segment size is too large. And the value of the present segment size is compared with the full limits which show

the minimum of the segment size considered to be suitable for the transmission system (S62). When the present segment size has already reached the minimum, segment size is set up with the permission minimum (S64). However, when the present segment size has not reached a minimum, segment size is reduced 10% (S66).

[0035]Next, new segment size is returned to the mobile client 16, and is used by the digital multimedia data frame of the following real time (S68). Thus, segment size is inspected by the degree of transmission of a digital data frame, and judges size with optimal segment within the limits of a maximum and a minimum. That is, it is clear for the especially suitable quick and reliable transmission for a radio link to be attained with the variable segment size communications protocol 70.

[0036]The two-layer data server cluster 20 is explained referring to drawing 1, and 3 and 4. The two-layer data server cluster 20 is provided with the following.

The 1st layer server T1a, T1b.

The 2nd layer server T2a managed by this 1st layer server, T2b, T2c, T2d, T2e, T2f.

The outline of the relation between two-layer servers and the relation between the two-layer data server cluster 20 and the live mobile camera system 10 is as being shown in drawing 1. Therefore, the demand of a communication interface is received by T1a which is the 1st layer server. Usually, the one or more 1st layer servers T1a and T1b were provided, and the 1st layer each server T1a and T1b have managed many 2nd layer servers T2a, T2b, T2c, T2d, T2e, and T2f.

[0037]The address of T1a which is the 1st layer server is usually memorized in the mobile client 16 as the 1st layer of default server T1a of a communications partner. May change setting out of the mobile client 16 into the address of the 1st layer server T1b of backup, and, Or the default 1st layer server T1a is changed into the 1st layer of substitution server T1b, and the down time of the main 1st layer server T1a may be absorbed, or it may be made to cope with the problem of other load imbalance.

[0038]If the 1st layer server T1a receives the demand of a communication interface, the 1st layer server T1a will transmit the identification information of this demand and a claimant to the 2nd layer server T2a which the 1st layer server T1a manages, T2b, and each of T2c. by answering the mobile client 16, the 2nd layer server T2a, T2b, and each of T2c show the availability of each server for a communication interface, and provide each [of each 2nd layer server T2a, T2b, and T2c] address as shown in drawing 3. in addition to this, the 2nd layer server T2c answers this communication connection request before other 2nd layer servers T2a and T2b as a result of an availability situation with the 2nd layer server T2a, T2b, and the communication load of each T2c. And the mobile client 16 sets up a communication interface with the 2nd layer server T2c which answered first, and ends communication with the 2nd layer server T2a and T2b which answered later. Next, the 2nd layer server T2c which set up the

communication interface provides the link between the mobile client 16 and the browser client 28 by transmitting the received data to the database server 22, the map server 24, and the web server 26.

[0039]As for drawing 4, management / managing-for 1st layer server T1a, T1b and 2nd layer server T2a, T2b,c [T2], T2d,e [T2], and T2f relations show down time absorption of the 1st layer server, and the case where it changes for the purpose, such as load balancing, in addition to this. When the 1st layer server T1a is likely to stop at any moment, the server T1a rearranges the 2nd layer server T2a which a subordinate has, T2b, and T2c to the subordinate of other 1st layer servers T1b. That is, the 1st layer server T1a which refrained from the stop close at hand transmits the demand which puts the 2nd layer server T2a on a subordinate, and manages it to the 1st layer server T1b. The management / relation to be managed between the 1st layer server T1a which is due to be stopped, and the rearranged 2nd layer server T2a are ended here. The 1st layer server T1a which is due to be stopped repeats rearrangement processing by transmitting a demand to other 1st layer servers until the remaining T2b of a subordinate's 2nd layer server and T2c are rearranged.

[0040]In the two-layer data server cluster 20, it is clearer by laying a communication interface on other servers with less load that it becomes possible to maintain the load balance between many servers than the above point. Since the data server cluster 20 is able to balance communication load, it becomes possible to process the total traffic of higher load compared with the server system of a conventional type. Therefore, the same throughput as the traffic allowable load which the expensive quicker server of processing speed is processing now can be attained using a smaller and cheap server. A standard Internet communication protocol can be used for the communication between the 1st layer server and the 2nd layer server, and communication between the 1st layer servers in this two-layer data server cluster 20. That is, the 1st layer server and the 2nd layer server may be mutually different discrete networks. It may be a discrete server network in which similarly each of the 2nd layer server in the group stationed at each subordinate of the 1st layer server is also separate.

[0041]Although the desirable embodiment of this invention has been described, this invention is not limited to this embodiment, but is correctable within limits which do not deviate from an invention. The scope of an invention is defined as the claim written in addition, and all devices applicable within the limits of the meaning of a claim are included by this claim irrespective of whether it is literal or it is an equivalent.

[0042]

[Effect of the Invention]As explained above, according to the live mobile camera system concerning this invention, it becomes possible to carry out balancing of the communication load between the servers of the plurality of a network which can transmit the digital multimedia data of real time by fewer transit delays and a low error rate, and is different.

[Translation done.]

CLAIMS

[Claim(s)]

[Claim 1]Digital data is classified into a segment in the 1st application layer, A communications protocol packet-izing said segment in the 1st Internet Protocol layer, reassembling said packet in the 2nd Internet Protocol layer, and reassembling said segment in the 2nd application layer.

[Claim 2]The communications protocol according to claim 1 inspecting whether said packet has an error and changing said segment size according to a result of said packet inspection.

[Claim 3]When a packet error is not detected by said digital data by said packet inspection, The communications protocol according to claim 2 characterized by making said segment size reduce when said segment size is expanded and a packet error is detected by said digital data by said packet inspection.

[Claim 4]The communications protocol according to claim 2, wherein said segment size is changed between a minimum and a maximum.

[Claim 5]When a packet error is not detected by digital data by said packet inspection and said segment size is said maximum, When said segment size is not changed, and a packet error is not detected by digital data by said packet inspection and said segment size is not said maximum, When said segment size is expanded, and a packet error is detected by digital data by said packet inspection and said segment size is a minimum, The communications protocol according to claim 4 when it is not changed but a packet error is detected by digital data by said packet inspection, and said segment size is not a minimum, wherein said segment size reduces said segment size.

[Claim 6]The communications protocol according to claim 1 having a process in which said packet is transmitted and received via a radio link between processes of reassembly of said packet-izing and said packet.

[Claim 7]The communications protocol according to claim 1 inspecting whether said packet has an error, and not broadcasting again a segment which does not have a packet error, but

broadcasting again only a segment which has a packet error.

[Claim 8]The communications protocol according to claim 1 inspecting whether said packet has an error and broadcasting [application layer / said / 1st] at least 1 of said segment again from said 1st Internet Protocol layer according to a result of said packet inspection.

[Claim 9]Inspect whether said packet has an error and size of said segment is changed according to a result of said packet inspection, The communications protocol according to claim 1 broadcasting [application layer / said / 1st] at least 1 of said segment again from said 1st Internet Protocol layer according to a result of said packet inspection.

[Claim 10]When a packet error is not detected by said digital data by said packet inspection, said segment size is expanded, When an error is detected by said digital data by said packet inspection, said segment size is reduced, The communications protocol according to claim 9, wherein said segment size is changed in the range of a minimum and a maximum, and is broadcast again only to said segment which has a packet error and said segment which does not have a packet error is not broadcast again.

[Claim 11]The communications protocol according to claim 10 which has a process in which said packet is transmitted and received via a radio link between processes of said packet-izing and reassembly of said packet, and is characterized by said Internet Protocol layer being a user datagram protocol.

[Claim 12]The communications protocol according to claim 1 or 11 generating said digital data which is a digitization picture of vision environment of the mobile client circumference in a live mobile camera system.

[Claim 13]Inspect whether said packet has an error, change size of said segment according to a result of said packet inspection, and between processes of said packet-izing and reassembly of said packet, The communications protocol according to claim 1 having a process in which said packet is transmitted and received via a radio link.

[Claim 14]The communications protocol according to claim 1 or 13, wherein said Internet Protocol layer is a user datagram protocol.

[Claim 15]Are a server cluster which has the 1st layer and the 2nd layer, and each of said 1st layer and said 2nd layer has a server of at least 1, A server cluster, wherein said 2nd layer answers said demand by said 1st layer's managing said 2nd layer, and said 1st layer's receiving a demand which asks for a communication interface, and transmitting said demand to said 2nd layer.

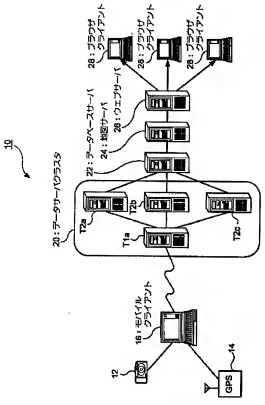
[Claim 16]The server cluster according to claim 15, wherein said 2nd layer has a server of at least 2.

[Claim 17]The server cluster according to claim 16 if the 2nd layer each server answers said demand and the first 2nd layer server answers, wherein a communication interface will be set up.

[Claim 18]The server cluster according to claim 15, wherein said 1st layer comprises a server of at least 2 and each of said 1st layer server manages the 2nd layer server of at least 2.
[Claim 19]The server cluster according to claim 18, wherein a server of 1 of said two or more 1st layer servers re-assigns a subordinate of other servers of 1 of said two or more 1st layer servers a server of 1 of said two or more 2nd layer servers which self manages.
[Claim 20]In said re-assignment, the 1st layer server which performs said re-assignment, a message which asks for acceptance of said server of 1 of said two or more 2nd layer servers -- said two or more 1st layer servers -- said -- others -- transmitting to a server of 1 -- said two or more 1st layer servers -- said -- others -- a server of 1, if said request message is received, The server cluster according to claim 19 setting up manage said server of 1 of said two or more 2nd layer servers.
[Claim 21]The server cluster according to claim 18 which a server of at least 2 of said 1st layer server communicates mutually using Internet Protocol, and is characterized by said server of at least 2 being a different server network.
[Claim 22]The server cluster according to claim 18, wherein a claimant transmits a demand which asks for said communication interface and said claimant memorizes one identification information of said two or more 1st layer servers as a default server of a transmission destination of said demand.
[Claim 23]The server cluster according to claim 22, wherein said claimant updates identification information of two or more of said memorized 1st layer servers and said claimant chooses either of said two or more 1st layer servers as a transmission destination of said demand.
[Claim 24]The server cluster according to claim 15 which said 1st layer communicates with said 2nd layer using Internet Protocol, and is characterized by said 1st layer and said 2nd layer being different server networks.
[Claim 25]The server cluster according to claim 24, wherein said server of at least 2 of the 2nd layer is a different server network.
[Claim 26]The server cluster according to claim 15, wherein a radio link is connected with said demanded communication interface.
[Claim 27]The server cluster according to claim 15, wherein a live mobile camera system has a mobile client with a camera, and photos visual images of said mobile client circumference with said camera and said picture is transmitted via said communication interface.
[Claim 28]A communication interface will be set up, if the 2nd layer each server answers said demand and the first 2nd layer server answers, Said 1st layer comprises a server of at least 2, and by this each of two or more of said 1st layer servers, Manage the 2nd layer server of at least 2, and a server of 1 of said two or more 1st layer servers, Re-assign a subordinate of other servers of 1 of said two or more 1st layer servers a server of 1 of said 2nd layer server

which self manages, and said 1st layer server of at least 2, It communicates mutually using Internet Protocol and said 1st layer server of at least 2 is a different server network, The server cluster according to claim 16 which said 1st layer communicates with said 2nd layer using Internet Protocol, and is characterized by said 1st layer server and said 2nd layer server being different server networks.

Drawing selection Representative drawing



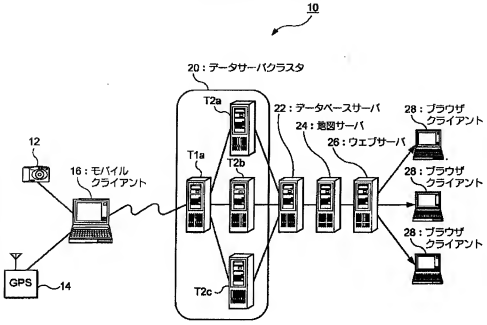
[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
This invention includes the composition and operation method, makes them people in general into an attached drawing, and is illustrated.
[Drawing 1]It is a block diagram of a live mobile camera system.
[Drawing 2]It is a flow chart of a communications protocol.
[Drawing 3]It is a block diagram of a live mobile camera system, and the case where a mobile station sets a communication interface to the 2nd layer server is shown.
[Drawing 4]It is a block diagram of a server cluster and the case where the 1st layer server re-assigns the subordinate of other 1st layer servers the 2nd layer server is shown.

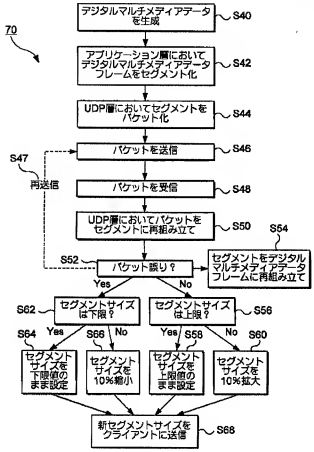
[Translation done.]

Drawing selection Drawing 1



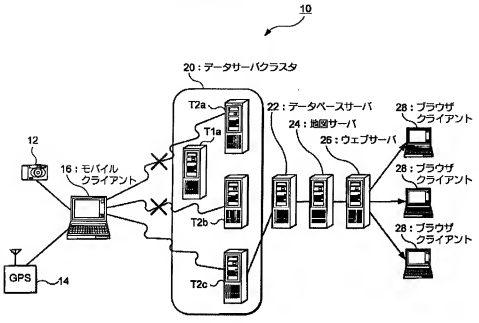
[Translation done.]

Drawing selection Drawing 2



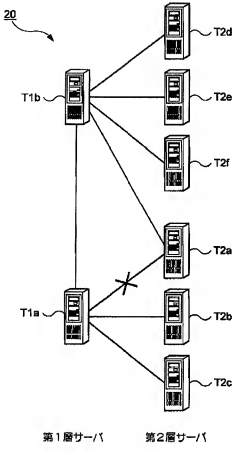
[Translation done.]

Drawing selection Drawing 3



[Translation done.]

Drawing selection Drawing 4



[Translation done.]